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drates, which is usually made by difference. Agricultural analysts hereafter should use the factors mentioned instead of the common factor 6.25, which has been so long employed.

The use of the basic bessemer process for the manufacture of steel from phosphoriferous pig iron has not yet been fully established in this country. The agricultural importance of this branch of manufacture is found in the production of basic phosphatic slags. In Europe this industry has grown to an enormous magnitude, and it is estimated that at the present time the rate of production in that country is a million and a-half tons of basic slag annually. All this material has found a ready market in the fertilizer trade, and the result has been a corresponding depression in the prices of superphosphates.

The methods of valuing the fertilizing properties of basic slag have lately been worked out very thoroughly in different localities in this and other countries. The difficulties attending the solution of the phosphoric acid in acid ammonium citrate are found chiefly in the varying quantities of uncombined lime which the slags contain. This subject was introduced at the last meeting of the Association of Official Agricultural Chemists, but the discussion was only of a formal nature, it having been relegated to the next meeting.

In addition to the chemical methods of analysis the separation of the slags into silts of different magnitudes will probably prove of use. This cannot be accomplished by subsidence in water, on account of the solvent action of the water on the quicklime present. The substitution of alcohol of appropriate strength, however, obviates this difficulty and renders the mechanical separation of the slags easy of accomplishment.

In this country basic slags have been

manufactured only at Pottstown, Pa., and at Troy, N. Y. I visited a large factory at Troy last winter, which was then in full action, but I believe it has been shut down on account of the low price of steel billets. It is believed, however, that a vast quantity of phosphatic iron ores will soon be brought into the market in this country and that the by-product, basic slags, will find a ready agricultural use.

Experience has shown that these slags act happily on sandy soils, and, in fact, in most cases can replace the acid phosphates where phosphoric acid is indicated in the application of fertilizers. The association of agriculture and manufacture in this respect cannot fail to be of value, and it may soon be possible to offer to the farmer available phosphoric acid, in the form of basic slags, at a lower price than can be profitably asked for acid phosphates.

In terminating this brief review of recent progress in agricultural chemistry, I am as fully aware as any of you of the imperfect nature of the *résumé* which has been given. I was not asked, however, until a short time ago to prepare this paper, and have been compelled to gather the information by piecemeal and in the intervals of other pressing duties. I am certain that in my hurry I have omitted many points of progress made by our own investigators which ought to have been incorporated in the paper. I only hope that the one who is next called upon to present a *résumé* of this progress may be given a longer time in which to prepare for his duties.

H. W. WILEY.

DEPARTMENT OF AGRICULTURE,
WASHINGTON, D. C.

THE MONTREAL MEETING OF THE GEOLOGICAL SOCIETY OF AMERICA.

I.

THE Geological Society of America assembled in Montreal, December 28th, for its

tenth annual meeting. The Council met at 10 a. m. and performed the usual routine business of canvassing the votes for officers and new members and the reports of the Secretary, the Treasurer and the Editor. The Society held its first formal session at 2:30 p. m. in the lecture room of the Peter Redpath Museum of McGill University. This is the lecture room in which for so many years Sir J. William Dawson, past President of the Society, delivered his lectures, and it was felt by all present to be peculiarly appropriate that the Society should gather within its walls. One of the first proceedings was to send a greeting to Sir William, who was prevented by illness from being present.

A cordial address of welcome was presented by George Hague, Esq., of the Board of Governors of McGill University, who happily referred to the ties that unite men of science and that recognize no political boundaries. President Orton, of the Society, returned a felicitous response to the address of welcome, after which the report of the Council was distributed in printed form. This showed the Society to be in a very prosperous condition. There are 242 members on the roll, which with the four elected at the meeting make a total of 246. As will readily appear, this number embraces practically all the geological workers in North America. The *Bulletin*, the published proceedings of the Society, is meeting with a gratifying sale outside of the active members. From this source the past year \$772.05 were realized, which defrayed about half the expense of publication. The Society has an invested fund of \$3,000, and closed the fiscal year November 30, 1897, with a further balance in the Treasurer's hands. This will make possible the more elaborate illustration of future papers. The Society has now a valuable library from exchanges, and this year added a librarian, Professor H. P. Cushing, of Adelbert College, Cleve-

land, to its list of officers. The library is placed in Cleveland, which is a central point as regards the membership.

When the vote was declared, the following nominees were announced as elected by an almost unanimous ballot:

President: JOHN J. STEVENSON, New York City.

First Vice-President: BENJ. K. EMERSON, Amherst, Mass.

Second Vice-President: GEORGE M. DAWSON, Ottawa, Ont.

Secretary: H. L. FAIRCHILD, Rochester, N. Y.

Treasurer: I. C. WHITE, Morgantown, W. Va.

Editor: J. STANLEY-BROWN, Washington, D. C.

Councillors: W. M. DAVIS (for unexpired term of B. K. Emerson), ROBERT BELL, Ottawa, Ont.; M. E. WADSWORTH, Houghton, Mich.

John M. Clarke, of Albany; George L. Collie, of Beloit; Arthur M. Miller, of Lexington, Ky., and James E. Talmage, of Salt Lake City, were elected Fellows. Two proposed amendments to the constitution were carried. Professor W. B. Scott delivered an appreciative and impressive memorial of Edward D. Cope; and one of Joseph F. James, prepared by T. W. Stanton, was read by J. F. Kemp, in the absence of its author. The reading of papers was then begun.

Notes on the Sands and Clays of the Ottawa Basin. R. W. ELLS, Ottawa, Canada.

Dr. Ells included in the area discussed the region lying between Lakes Huron, Erie and Ontario, and the Ottawa river. He gave a brief review of the rocks lying to the north, which have been the source of the loose materials now forming the surface deposits. The sands and the marine clays, so prolific in shells, and several kame-like ridges were described, and the evidence of submergence beneath the sea was adduced at length. In general the interpretation corroborated the views already urged by Sir J. William Dawson, and widely familiar.

The discussion was quite protracted and developed a variance in interpretation on

the part of the several speakers. The close connection of the glacial lakes, the precursors of the present Great Lakes, with the sands and clays was brought out; the presence of marine and fresh-water shells and the evidence of differential uplift all came up. The discussion was sustained by Messrs. Scott, Taylor, Ami and Coleman.

Topography and Glacial Deposits of the Mohawk Valley. ALBERT PERRY BRIGHAM, Hamilton, N. Y.

The present topography of the Mohawk Valley was described and some probable features of the ancient drainage stated. The Mohawk was considered as a monoclinal valley following the outcrop of the Utica and Hudson River shales which had diverted the southern Adirondack drainage by headward cutting west to Little Falls. Further evidence for the divide located by Chamberlin at this point was given in the valley filling and arrangement of streams to the westward. A possible discharge of the West Canada Creek into the main valley west of Utica was suggested. The Mohawk faults were reviewed in their bearing on the maturing of the valley. The westward movement of the lower Mohawk Valley glacier was confirmed by some additional evidence. The drift deposits fall into three groups, viz.: terraces and deltas west of Utica; terraces, kames and other morainic masses between Utica and Little Falls; terraces of massive till mantled by sands and clays, below Little Falls. The drift of the valley was described as representing lacustrine and fluvial phases of ice retreat, and some reasons were given for a discharge prolonged and strong, but not of great depth.

The paper was illustrated by a good map and was listened to with deep attention, as so many of the fellows were familiar with the region. The evidence of stream robbing by the Mohawk in its upper portion

and the diversion of the southwest Adirondack drainage to the Hudson was striking.

The paper was discussed by F. B. Taylor. At its conclusion the Society adjourned until 8:30 p. m., at which time it reconvened in the Physics lecture room of the University, to listen to the presidential address of the retiring President, Professor Edward Orton. The subject was 'Geological Probabilities as to Petroleum' and was an able review of the hypotheses advanced regarding oil and gas. The speaker was happily introduced by Dr. George Dawson, Director of the Canadian Geological Survey.

On Wednesday, at 10 a. m., the meetings were resumed. Before the reading of papers was begun the Committee on Photographs presented a report from its Chairman, Dr. George P. Merrill, of Washington. The report showed that 134 new photographs had been received during the year, bringing the number up to 1,558. The Committee has also received a collection of 300 negatives taken by the Second Geological Survey of Pennsylvania. An exhibition of the pictures now in the possession of the Society was made in an adjoining room, and it was evident that a wealth of illustrative material for geological instruction has been made available, from sources, such as survey negatives, that are not usually accessible.

The Topography and History of Jamesville Lake, N. Y. EDMUND C. QUEREAU, Syracuse, N. Y.

Jamesville Lake is one of a class of small lakes in central New York which are often called 'Round Lakes,' a term which distinguishes them well from the 'Finger Lakes.' It lies between two of the main valleys (Onondaga and Butternut) which dissect in this region the New York plateau in a general south-north direction. The portion of the plateau between these two valleys is dis-

sected also, but not so deeply, by a series of small parallel west-east gorges or ravines, in one of which, the Jamesville gorge, the lake is situated. The immediate vicinity of the lake is channeled in a complicated manner by abandoned stream beds which run west-east, and whose sides are often terraced in such a manner as to make it evident that large quantities of water once passed across this region. Associated with these channels a number of kettle-like depressions are found, of round or oval outline and of varying dimensions. It is in one of the largest of these that the present Jamesville lake is situated. The lake basins were explained as probably caused in each case by a waterfall, which had hollowed out a depression or great pool at its foot.

The paper was discussed by W. M. Davis, who corroborated, from his own observations in the region, the views of the author; by H. L. Fairchild, who commented on the altitudes, and by F. B. Taylor, who connected the streams with the drainage of the glacial Lake Warren. This led to some estimate of the probable size of the river, and it was stated by A. P. Brigham and W. M. Davis to have been less than the present Niagara.

Notes on the Moraines of the Georgian Bay Lobe of the Ice-sheet. FRANK B. TAYLOR, Fort Wayne, Ind.

When the ice-sheet had retreated in the basin of Lake Huron so far as to leave the summit of Blue Mountain south of Georgian Bay uncovered, there still remained a well defined glacial lobe projecting towards the southeast nearly to Toronto and eastward beyond Lake Simcoe. This lobe was divided in two parts by the Penetang peninsula, the larger one extending southeast from Nottawasaga Bay, and the smaller one extending east-southeast from Matchedash Bay. Recently the moraines of the eastern limb of the Nottawasaga lobe were par-

tially explored and a well defined series of five was found filling the interval from the head of Georgian Bay to the 'Oak Ridges' north of Toronto. During the later stages of this lobe there was a glacial lake covering Lake Simcoe and a considerable area to the east, and probably held up on that side by a lobe projecting from the northeast up the valley of the Trent River. Its beach is 90 to 100 feet above the Algonquin beach, a few miles northeast of Barrie. Well marked glacial striæ were found on the summit of the promontory of Blue Mountain, over 1,100 feet above Georgian Bay, running S. 60° E. Some of the moraines running along the east side of Lake Huron were also traced northward to the vicinity of Durham and Flesherton.

T. C. Chamberlin inquired regarding the direction of the glacial striæ as bearing on the views advanced, and the speaker replied that they bore S. 60° E. wherever visible. This brought out the observations of H. M. Ami that striæ in Ontario to the southwest of this region run southwest, and Robert Bell stated that they run southeast on Georgian Bay, but that at its north end they change to southwest. Robert Chalmers referred to the ridges, like drumlins, along Lake Ontario, on the line of the Pacific Railroad, and remarked that the associated striæ were variable from southeast to southwest. I. C. White asked about the height of the old Algonkian beach above Lake Simcoe, and F. B. Taylor replied that it was about 100 feet above the lake, which latter is 720 feet above tide.

Notes on the Geology of Montreal and Vicinity.

FRANK D. ADAMS.

By means of the geological sheets of the Canadian Survey, Dr. Adams outlined the extent of the several formations from the old Laurentian gneisses, anorthosites and crystalline limestones on the north across the Paleozoic plain to the south. He gave

a brief description of the curious volcanic plugs now remaining as Mt. Royal and several others in an easterly line from it, and in a few words referred to their interesting petrographical character. The remarkable survival of Lower Helderberg strata in a patch of a few square feet on an island in the St. Lawrence, near Montreal, excited great interest, especially in their bearing on the views lately advanced by H. S. Williams on the line of entry of the late Silurian fauna into New York. The post-Pliocene deposits in the shape of the boulder clay; the bouldery gravels and stiff overlying clay; the Leda-clay and the Saxicava sand, all of which are carved into the marine beaches which now form the terraces on which the city is built, received passing mention. The way in which the geological structure had determined the location of the city and the settlement of the country was the closing topic of the paper.

The discussion turned at first on the determining factors in the present relations of of the ancient crystallines and the paleozoics, and whether the rather straight contact shown on the map is the result of faulting or of the creeping-up of the Cambrian sea on an even shore-line. Dr. George Dawson and several other Canadian geologists said that there were no faults, but that the inroad of the sea had brought about the phenomena. The discussion then turned on the course of events in the region in the times after the latest paleozoic sediments and before the superficial deposits had accumulated, and developed the fact that it is easy to ask questions which no Fellow can answer. The discussion also turned on the Helderberg outlier and its relation to the older Ordovician strata. It was shown to rest on a curious tufa deposit, but, as remarked by H. M. Ami, the Devonian to the east rests unconformably on the Cambrian. The discussion was participated in by H. P. Cush-

ing, H. M. Ami, W. M. Davis, George M. Dawson, J. H. Tyrrell, R. W. Ells and F. B. Taylor.

Marine Cretaceous Formations in Deep Wells in Southeastern Virginia. N. H. DARTON.

The paper was read by W. N. Rice, in the absence of the author. It recorded the sections recently revealed by deep wells at Norfolk, Va., Fortress Monroe, Lambert's Point and Jetty Point. They show that the marine Cretaceous, which was thought to be growing thin in southern New Jersey, thickens again farther south.

The Cretaceous Series of the West Coast of Greenland. CHARLES SCHUCHERT and DAVID WHITE.

The paper was presented by David White and described the results obtained the past summer while exploring the plant beds along the Nugsuak peninsula. On a base of gneisses lie 3,000 feet of sediments forming the plant beds, and on these, 4,000 feet of basalt flows. The beds dip away from the gneisses and are available between tidewater and the basalt, which covers their upturned edges and pierces them in dikes. The stratigraphical section, with the European equivalents, is as follows:

Patoot = Senonian	} Cretaceous
Atane = Cenomanian	
Kome = Urgonian	

All corresponded to the American Potomac formation, except, perhaps, the Patoot. Marine fossils were also found, giving the offshore equivalents of the plant beds. The latter are remarkable in affording dicotyledons. W. B. Scott asked about the equivalency of the Potomac, to which the speaker replied that it would be fully discussed in an early paper by Dr. L. F. Ward. T. C. Chamberlin inquired as to the climatic conditions as indicated by the Potomac floras north and south. Mr. White replied that they showed no climatic

differences, and that the Nugsuak plant beds filled up hollows in the gneisses, and were not very different now in their position as regards the sea from that occupied at the time of their deposition.

(*To be concluded.*)

J. F. KEMP.

COLUMBIA UNIVERSITY.

THE SECTION OF ANTHROPOLOGY AT ITHACA.

IN accordance with an arrangement made at Detroit, a meeting of Section H (Anthropology) of the American Association for the Advancement of Science was held at Cornell University, at Ithaca, December 29 and 30, 1897.

On Wednesday morning, December 29th, the Section organized with Vice-President W J McGee in the chair and Dr. A. Hrdlicka as Secretary *pro tem*. Immediately afterward the session adjourned to permit the members to attend the meeting of the American Psychological Association then in progress, and to unite with the American Society of Naturalists during the afternoon.

The Section reassembled for the reading of papers Thursday morning. The first communication was a full account of the elaborate 'Mythology of the Bella Coola,' by Dr. Franz Boas. After describing the beliefs of this remarkably interesting Indian tribe, the author proceeded to a comparison of these beliefs, and the ceremonies by which they are attended, with those of neighboring tribes, and discussed the development of myths in general as well as the special lines of mythic development traced among the Bella Coola. Comments were made by Dr. Farrand, Professor Cattell and Dr. Beauchamp.

This was followed by a paper on the 'Loss of Aboriginal Arts and its Significance,' by Rev. W. M. Beauchamp, in the course of which the author emphasized

the transformation in the aboriginal arts of central New York attending the incursion of conquering tribes.

On behalf of the Committee of the Association on 'The Ethnography of the White Race in the United States,' Dr. Boas made a brief report of progress.

The next communication was an illustrated account of 'Dwellings of the Saga Time in Iceland, Greenland and Vineland,' by Miss Cornelia Horsford. Beginning with a description of the Norse Sagas, covering the period A. D. 875-1025, Miss Horsford noted the recent researches concerning the habitations described in the Sagas. None of these have thus far been identified in Denmark, Sweden or Norway, but several have been identified with considerable certainty in Iceland, chiefly through the investigations of the Icelandic Antiquarian Society, and also in Greenland, while a few have been identified with fair certainty in the 'Vineland the Good' of the Sagas—what is now eastern Massachusetts. The houses of the three countries were illustrated and shown to be essentially similar by means of photographs and sketches of the ruins, and were identified in design and other characteristics with the house-types still surviving in Iceland. The paper was discussed by Dr. Boas, who pointed out the essential distinctness of the habitations described from those of the aborigines of America, including the Eskimo. Remarks concerning the extent and thoroughness of the investigation were also made by Dr. Beauchamp and the presiding officer.

The afternoon session began with a brief paper on 'Eskimo Boot Strings,' by John Murdoch. This was followed by an extended 'Preliminary Report on the Somatology of the Tribes of Northwestern Mexico,' by Dr. A. Hrdlicka, in the course of which a large number of crania from Mexico and the United States were described, while the distribution of the types